

Notice of Allowability

Application No.

10/689,218

Examiner

Evan Pert

Applicant(s)

PAPA RAO ET AL.

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable; PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the application filed October 20, 2003.
2. ☒ The allowed claim(s) is/are 1-22.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☒ including changes required by the attached Examiner's Amendment Comment ~~or in the Office action of~~ ~~Paper No./Mail Date _____~~
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

Drawings

1. The drawings are sufficient for examination, but are informal for a printed patent. Furthermore, reference numeral "79" in Fig. 2 should read --70--. Since the case is allowed, formal drawings are required in response to this Office Action, including the required correction to Fig. 2.

Allowable Subject Matter

2. Claims 1-22 are allowed.
3. The following is an examiner's statement of reasons for allowance:

Applicant's invention provides for non-contact temperature measurement of semiconductor wafers, which is useful during processing of the wafers to make semiconductor devices.

Regarding claims 1-4, the prior art does not disclose applicant's claimed "method for measuring the temperature of a semiconductor wafer," characterized by "monitoring an inductance of a coil placed adjacent a semiconductor wafer to determine the semiconductor wafer temperature from the inductance of the coil."

Regarding claims 5-8, the prior art does not disclose applicant's claimed "dual coil method," characterized by "monitoring electromotive force induced in a second coil to determine semiconductor wafer temperature" along with "a first coil placed adjacent a semiconductor wafer."

Regarding claims 9-12, the prior art does not disclose applicant's claimed "temperature probe apparatus," characterized by "first and second coils in an enclosure with a first material in the enclosure, wherein the first material possesses a temperature dependent conductivity."

Regarding claims 13-16, the prior art does not disclose applicant's claimed "method for temperature measurement," characterized by "measuring electromotive force induced in a second coil" to "determine a temperature of a piece" after "placing a first material against the piece whose temperature is to be measured," and "placing the first material against adjacent a first coil."

Regarding claims 17-22, the prior art does not disclose applicant's claimed "apparatus for measuring the temperature of a semiconductor wafer," characterized by "a mount to hold a semiconductor wafer positioned in a semiconductor processing tool" with "an electronic apparatus connected to a coil to provide an AC current excitation to the coil and to monitor an inductance of the coil."

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5,477,035 and US 5,354,130 disclose non-contact temperature measurement using a coil near the sample being measured, using resonance, but do not disclose semiconductor wafer temperature measurement.

US 4,799,046 is cited for disclosing a method for measuring the temperature of a coil, possibly applicable for calibration of applicant's embodiment using only a first coil without a second coil, wherein temperature of the first coil could must be accounted for.

US 4,095,469 discloses an invention that uses a coil adjacent a metal sample to measure temperature, but does not mention of semiconductor processing or wafers.

US 3,707,873 is cited for disclosing an invention particularly related to claim 9 since there are two coils and a first material whose temperature is measured, but the temperature measurement is based on detection of volume expansion of materials that have measurable expansion rather than changes in electrical conductivity as recited in claim 9.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Tokar can be reached on 571-272-1812. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP
September 27, 2004


EVAN PERT
PRIMARY EXAMINER